

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

United States Patent and Trademark  
Office  
(Box PCT)  
Crystal Plaza 2  
Washington, DC 20231  
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

<b>Date of mailing (day/month/year)</b> 03 March 1999 (03.03.99)	<b>Applicant's or agent's file reference</b> P.KUL.02/WO
<b>International application No.</b> PCT/EP98/02590	<b>Priority date (day/month/year)</b> 30 April 1997 (30.04.97)
<b>International filing date (day/month/year)</b> 04 May 1998 (04.05.98)	
<b>Applicant</b> DEBYSER, Winok et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:  
13 November 1998 (13.11.98)

☐ in a notice effecting later election filed with the International Bureau on:  
\_\_\_\_\_

2. The election ☒ was  
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

R. E. Stoffel

Telephone No.: (41-22) 338.83.38

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/EP98/02590

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
- ☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 1-7 are so unclear that no meaningful opinion could be formed (*specify*):

**see separate sheet**

- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☐ no international search report has been established for the said claims Nos. .

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims 8-33
	No: Claims
Inventive step (IS)	Yes: Claims
	No: Claims 8-33
Industrial applicability (IA)	Yes: Claims 8-33
	No: Claims

**2. Citations and explanations**

**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/EP98/02590

1. The following documents (D) are referred to in this International Preliminary Examination Report; the numbering corresponds to the order used in the Search Report, the numbering will be adhered to in the rest of the procedure:  
D1 to D8
2. The priority documents pertaining to the present application were not available at the time of establishing this first written opinion. Hence, it is based on the assumption that all claims enjoy priority rights from the filing date of the priority document. If it later turns out that this is not correct, the documents D5 to D7 cited in the International Search Report could become relevant to assess whether the claims under examination satisfy the criteria set forth in Article 33(1) PCT.

**Article 6 PCT**

- 3.1 The expression proteinic or glycoprotein inhibitor used in claims 1-7 is vague and unclear and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claims unclear (Article 6 PCT). In consulting the description (page 4, lines 23 to page 5, line 9) it gets apparent that the term proteinic or glycoprotein inhibitor is used in an absolutely largest meaning including the whole range of partial inhibition to complete inhibition and reversible inhibition, competitive inhibition, non-competitive inhibition etc. It would appear that the claims attempt to define the subject-matter in terms of the result to be achieved which merely amounts to a statement of the underlying problem. The technical features necessary for achieving this result should be added.
- 3.2 Claim 32 is not supported by the description as required by Article 6 PCT, as its scope is broader than justified by the description page 8, line 16-18. The reasons therefor are the following: The term pharmaceutical application used in claim 32 is used in a highly general manner. In studying the description that the pharmaceutical reliability is limited to applications as maintaining the structure of dietary fibre material.
- 3.3 Claim 24 should be limited to those embodiments which go back to claim 12. A claim relating to a micro-organism, plant and plant-material should necessarily include the exact structural feature which is provided/introduced by such process. Otherwise such claim is considered to be unclear and to disable the skilled person to rework the applications (Article 5/6 PCT).

In order to overcome these objections, it would appear appropriate to file an amended set of claims defining the relevant subject-matter in terms of /a single/a minimum number of/ independent claim/claims in each category followed by dependent claims covering features which are merely optional (Rule 6.4 PCT).

4. With respect to D1 to D4 and D8 novelty of the subject-matter of claims 8 - 15 and dependent subject-matter can be acknowledged.

**5. Inventive Step**

- D1: Inactivators for xylanases, exoxylanase/glucanase from *Cellulomonas fimi* was provided by 2,4-dinitrophenyl 2-deoxy-2-fluoro-beta-xylobioside.
- D2: Active-site of a cysteine containing peptide from the xylanase of a thermotolerant *Streptomyces*, inactivation of xylanase with DAM, N-(2,4-dinitroalino)maleimide.
- D3: Non-proteinique inhibitors of endo-xylanase (*Thermoascus aurantiacus*):  $\text{CuSO}_4$ , EDTA,  $\text{SnCl}_2$  and  $\text{ZnCl}_2$ .
- D4: Cellobiose and xylose as inhibitors of beta-xylanase activity.
- D8: *Aspergillus arabinofuranosidas* capable of degrading arabinoxylan.

As far as the requirements of inventive step are concerned it would appear that a person skilled in this art confronted with the problem of looking for inhibitors of cellulolytic, xylanolytic and beta-glucanolytic enzymes would have been able to deduce in an obvious manner from the teaching of D1 to D4 that proteins/glycoproteins are existing which would act as inhibitors of xylanase. Since from D2 the sequence of the active site cysteine containing peptide from the xylanase is already known, since in addition apparently from D3 the inhibitor is activated by means of  $\text{CuSO}_4$ , EDTA,  $\text{SnCl}_2$  and  $\text{ZnCl}_2$ , which were known to be involved in folding/refolding of proteins, it appears to be obvious to look also for proteins acting as inhibitors for xylanase, and with respect to D1 also to glycoproteins acting as inhibitors for xylanase. From D4 it is known that xylanases and endoglucanases from *Bacillus* strain are already known. Therefore, with the technical information at present in this file when compared to D1 to D4 taken alone and in combination, the requirements of inventive step are not satisfied.

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International application No. PCT/EP98/02590

6. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 to D4 are not mentioned in the description, nor are these document/s identified therein.

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>P. KUL. 02/WO</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/EP 98/ 02590</b>	International filing date (day/month/year) <b>04/05/1998</b>	(Earliest) Priority Date (day/month/year) <b>30/04/1997</b>
Applicant <b>K.U. LEUVEN RESEARCH &amp; DEVELOPMENT et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (see Box I).

2. ☐ Unity of invention is lacking (see Box II).

3. ☒ The international application contains disclosure of a **nucleotide and/or amino acid sequence listing** and the international search was carried out on the basis of the sequence listing

☒ filed with the international application.

☐ furnished by the applicant separately from the international application,

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.

☐ Transcribed by this Authority

4. With regard to the **title**, ☒ the text is approved as submitted by the applicant  
☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this International Search Report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is:

Figure No.            ☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☒ None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/EP 98/02590

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 C12N9/24 A23L1/185 A23L1/10 C07K14/415

According to International Patent Classification(IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 C12N A23L C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	ZISER, LOTHAR ET AL: "Syntheses and testing of substrates and mechanism -based inactivators for xylanases" CARBOHYDR. RES. (1995), 274, 137-53 CODEN: CRBRAT; ISSN: 0008-6215, XP002078666 whole document, esp. Figs. 1 and 2, Abstract ---	1-33
Y	KESKAR, SULABHA S. ET AL: "Characterization and sequencing of an active-site cysteine-containing peptide from the xylanase of a thermotolerant Streptomyces" BIOCHEM. J. (1992), 281(3), 601-5 CODEN: BIJOAK; ISSN: 0306-3275, XP002078667 Seite 603, Figs. 1-3 --- -/--	1-33



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

## ° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

28 September 1998

Date of mailing of the international search report

13/10/1998

Name and mailing address of the ISA

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Authorized officer

Kronester-Frei, A

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GOMES, D. J. ET AL: "Factors influencing the induction of endoxylanase by <i>Thermoascus aurantiacus</i> " J. BIOTECHNOL. (1994), 33(1), 87-94 CODEN: JBITD4; ISSN: 0168-1656, XP002078668 Abstract, Tables 1 and 2 ---	1-33
Y	PAUL, JAISHREE ET AL: "Influence of sugars on endoglucanase and .beta.-xylanase activities of a <i>Bacillus</i> strain" BIOTECHNOL. LETT. (1990), 12(1), 61-4 CODEN: BILED3; ISSN: 0141-5492, XP002078669 Abstract and Fig. 2 ---	1-33
P,X	DEBYSER, WINOK ET AL: "Arabinoxylan solubilization and inhibition of the barley malt xylanolytic system by wheat during mashing with wheat wholemeal adjunct: evidence for a new class of enzyme inhibitors in wheat" J. AM. SOC. BREW. CHEM. (1997), 55(4), 153-156 CODEN: JSBCD3; ISSN: 0361-0470, XP002078670 Last sentence of Abstract and Conclusion ---	1-6
P,X	SPURWAY, TRACEY D. ET AL: "Calcium protects a mesophilic xylanase from proteinase inactivation and thermal unfolding" J. BIOL. CHEM. (1997), 272(28), 17523-17530 CODEN: JBCHA3; ISSN: 0021-9258, XP002078671 whole document, especially Fig. 8 and Abstract ---	1-6
P,Y	WO 98 05788 A (SOUPE JEROME ;MOGEN INT (NL); BEUDEKER ROBERT FRANCISCUS (NL); GI) 12 February 1998 claims, examples ---	1-33
A	WO 96 29416 A (MADRID SUSAN MAMPUSTA ;DANISCO (DK); BARUCH ANITA (DK); RASMUSSEN) 26 September 1996 claims, examples -----	1-33



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 98/02590

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
W0 9805788	A	12-02-1998	AU	4116197 A	25-02-1998
W0 9629416	A	26-09-1996	AU	5104396 A	08-10-1996
			BR	9607535 A	06-01-1998
			CA	2214591 A	26-09-1996

# PATENT COOPERATION TREATY

# PCT

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REC'D 06 AUG 1999

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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT


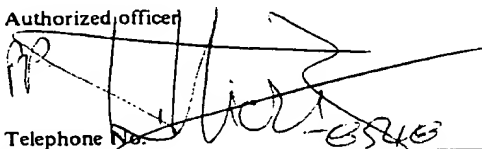
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference  P. KUL. 02/WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No.  PCT/EP 98/02590	International filing date (day/month/year)  04/05/1998	Priority date (day/month/year)  30/04/1997
International Patent Classification (IPC) or national classification and IPC  C12N9/24		
Applicant  K. U. LEUVEN RESEARCH & DEVELOPMENT et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This **REPORT** consists of a total of 6 sheets, including this cover sheet.
- ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consists of a total of \_\_\_\_\_ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand  13/11/1998	Date of completion of this report  04. 08. 99
Name and mailing address of the IPEA/   European Patent Office D-80298 Munich Tel. (+49-89) 2399-0, Tx: 523656 epmu d Fax: (+49-89) 2399-4465	Authorized officer  Telephone No. <u>65846</u>

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/EP98/02590

**I. Basis of the report**

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

**Description, pages:**

1-26 as originally filed

**Claims, No.:**

1-33 as originally filed

**Drawings, sheets:**

1/1-3/3 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application.  
☒ claims Nos. 1-7.

because: